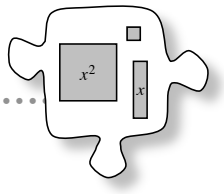
3.1.4 What can a variable represent?



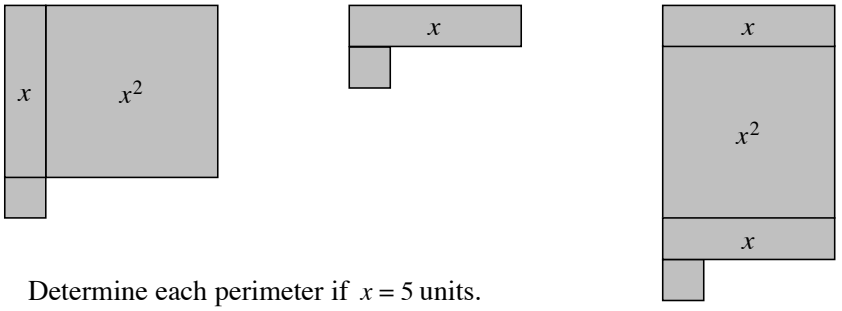
Evaluating Variable Expressions

In the past three lessons, you have learned how to find the perimeter and area of a shape using algebra tiles. Today, you will challenge the class to find the perimeter and area of shapes that you create. As you work, keep in mind these questions:

Which lengths are constant?

Which lengths can change?

3-34. Use the perimeter expressions you found in problem 3-29 to answer the questions below.



a. Determine each perimeter if $x = 5$ units.

b. Determine each perimeter if $x = 2\frac{1}{2}$ units.

c. Using a technology tool or grid paper as directed by your teacher, carefully draw each shape with the specified length of x units.

3-35. SHAPE CHALLENGE

You and your team will choose four algebra tiles that will be used to build a shape to challenge your classmates. You may choose whatever tiles you would like to use as long as you use exactly four tiles.

As a team, decide on the shape you want to make. Experiment with different shapes until you find one you think will have a challenging perimeter and area for your classmates to find. Then, to share your challenge with the class:

- Build the shape with algebra tiles in the middle of your team so everyone can see it.
- Get an index card from your teacher. On one side, neatly draw the shape and label each side.
- Write a simplified expression for the perimeter and for the area on the same side of the card. This will be the answer key. Show all of your steps clearly.
- Turn the card face down so the answer is hidden, put the names of your team members on the top of the card, and then put it beside the shape you built with your algebra tiles.

Remember, your work needs to be clear enough for your classmates to understand.

Follow your teacher's directions to complete challenges created by other teams. As you look at their shapes, sketch them on your paper. Work with your team to label the sides and find the perimeter and area of each shape. Be sure to combine like terms to make the expressions as simple as possible.

3-36. Choose two of the shapes from problem 3-35. Sketch each shape and label it with its perimeter and area. Do not forget the correct units. It is not necessary to draw the figures to scale. Rewrite each expression with the values given below and then evaluate it.

a. $x = 1.5$ units

b. $x = 3\frac{3}{4}$ units

3-37. LEARNING LOG

In your Learning Log, sketch a complex shape made out of algebra tiles (you might choose one from the Shape Challenge). Explain your **strategies** for finding the area and perimeter of the shape. Use color, arrows, and labels to explain your work. Title this entry "Perimeter and Area Using Algebra Tiles" and include today's date.

MATH NOTES

METHODS AND MEANINGS

Evaluating Expressions

The word **evaluate** indicates that the value of an expression should be calculated when a variable is replaced by a numerical value.

For example, when you evaluate the expression $x^2 + 4x - 3$ for $x = 5$, the result is:

$$(5)^2 + 4(5) - 3$$
$$25 + 20 - 3$$
$$42$$

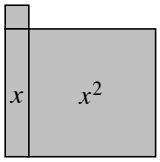
Using the expression $3x^2 - 5x + 2$ for $x = 4$, the result is:

$$3(4)^2 - 5(4) + 2$$
$$3(16) - 5(4) + 2$$
$$48 - 20 + 2$$
$$30$$

In each case remember to follow the order of operations.

Review & Preview

3-38. Sketch the algebra tile shape at right on your paper. Write an expression for the perimeter of the shape, then find the perimeter for each of the given values of x.



a. $x = 7$ units b. $x = 5.5$ units

c. $x = \frac{7}{3}$ units

3-39. Copy each expression and simplify it. Show all of your steps.

a. $1.234 + 0.58 + 5.316$ b. $6.1 - 1.536$ c. $4.8(0.6)$

3-40. Multiply $\frac{4}{5} \cdot \frac{1}{3}$. You may want to show your thinking with a diagram.

3-41. On a coordinate grid, graph these points to create a triangle:

$$(-2, 3),\ (3, -2),\ (-2, -2)$$

a. What kind of triangle is it?

b. Where could you add a fourth point so that when the points are connected you will make a rectangle?

c. What point can you add to create a trapezoid?

d. Translate the original triangle 5 units to the left and 4 units down. Label the coordinates of the vertices of the new triangle.

3-42. Simplify each expression.

a. $-\frac{4}{5} + \frac{3}{10}$ b. $2\frac{5}{8} - 1\frac{1}{3}$